

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RAJARAO JAMMY
and JACK A. MANDELMAN

Appeal No. 2002-2225
Application 09/295,132

ON BRIEF

Before WARREN, KRATZ and POTEATE, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

Decision on Appeal and Opinion

We have carefully considered the record in this appeal under 35 U.S.C. § 134, including the opposing views of the examiner, in the answer, and appellants, in the brief, and based on our review, find that we cannot sustain the rejections of appealed claims 1 through 7, 18 and 19,¹ all of the claims in the application, under 35 U.S.C. § 103(a) as being unpatentable over Vuillermoz et al. (Vuillermoz) in view of the knowledge in the prior art acknowledged by appellants in the specification (page 1, lines 21-23).²

It is well settled that in order to establish a *prima facie* case of obviousness under

¹ See the appendix to the brief and the amendment of April 5, 2001 (Paper No. 8).

² Answer, pages 3-4.

§ 103(a), the examiner must show that some objective teaching, suggestion or motivation in the applied prior art taken as a whole and/or knowledge generally available to one of ordinary skill in this art would have led that person to the claimed invention as a whole, including each and every limitation of the claims arranged as required by the claims, without recourse to the teachings in appellants' disclosure. *See generally, In re Rouffet*, 149 F.3d 1350, 1358, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998); *Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629-30 (Fed. Cir. 1996); *In re Fritch*, 972 F.2d 1260, 1265-66, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992); *In re Fine*, 837 F.2d 1071, 1074-76, 5 USPQ2d 1596, 1598-1600 (Fed. Cir. 1988); *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531-32 (Fed. Cir. 1988).. The requirement for objective factual underpinnings for a rejection under § 103(a) extends to the determination of whether the applied references can be combined. *See In re Lee*, 277 F.3d 1338, 1343, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002), and cases cited therein.

The dispositive issue in this appeal is whether one of ordinary skill in this art would have found in the combination of Vuillermoz and the knowledge in the prior art acknowledged by appellants the reasonable suggestion to modify a MOS transistor having a silicon nitride layer as an electrically conductive diffusion barrier between a tungsten electrical contact and a shallow doped region formed on a semiconductor substrate taught by Vuillermoz (e.g., abstract and cols. 1-4) by forming the electrical contact using a doped polysilicon in place of tungsten because it was known in the prior art that electrical contacts “are typically metal (i.e. tungsten) or a highly doped polycrystalline silicon (polysilicon) material” as acknowledged by appellants (specification, page 1, lines 21-23). We note that the conductive diffusion barrier shown in Vuillermoz is termed a quantum conductive barrier layer in appealed claim 1.

While we agree with the examiner that appellants acknowledge that tungsten and a doped polysilicon are art recognized to form electrical contacts, that fact alone does not establish that these otherwise chemically dissimilar materials are interchangeable in every application where an electrical contact is prepared by a particular process. The only process disclosed in the prior art applied by the examiner to prepare a MOS transistor having an electrically conductive diffusion barrier is shown in Vuillermoz and involves the formation of a silicon nitride layer from silicon

using a nitrogen-based plasma after tungsten is deposited as the electrical contact. It is clear from the process steps disclosed in Vuillermoz that the deposited tungsten sheds the nitrogen from the plasma in a subsequent annealing step.

On this record, we agree with appellants' argument that if a doped polysilicon was used as the electrical contact in place of tungsten in the process of the reference, the polysilicon would be converted at least in part, if not entirely, to silicon nitride in the presence of the nitrogen-based plasma. Thus, we find that the silicon nitride layer formed would be thicker than the electrically conductive diffusion barrier taught in Vuillermoz, which, on this record, would destroy the intended conductivity of this layer (*see* specification, page 4, line 21, to page 5, line 1). Therefore, we further agree with appellants that the use of a doped polysilicon as the electrical contact in the process set forth in Vuillermoz would not have enabled one of ordinary skill in this art to arrive at the structure having a quantum conductive barrier layer required by appealed claim 1. *See generally, In re Payne*, 606 F.2d 303, 314, 203 USPQ 245, 255 (CCPA 1979) (a reference relied upon under § 103 must provide an enabling disclosure, placing the claimed invention in the possession of the public). Indeed, one of ordinary skill in this art would have recognized that the structure obtained from the use of a doped polysilicon as an electrical contact would be inoperative for the purposes of Vuillermoz. *See In re Fritch*, 972 F.2d 1260, 1265-66, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992); *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

We are not convinced otherwise by the examiner's arguments. First, it is prior art and *not* the disclosure in appellants' specification, which must show that the interchange of tungsten and a doped polysilicon as electrical contacts in the context of the claimed structure on a semiconductor substrate is "non-critical" (answer, pages 5-6). *Cf. In re Saunders*, 444 F.2d 599, 606-07, 170 USPQ 213, 219-20 (CCPA 1971). Indeed, the claim language of the appealed claims must be considered vis-à-vis the prior art, regardless of the examiner's view thereof based on the disclosure in the specification (answer, pages 5-6). *Cf. Ex parte Grasselli*, 231 USPQ 393 (Bd. App. 1983), *aff'd mem.*, 738 F.2d 453 (Fed. Cir. 1984). And, second, we know of no authority which supports the examiner's position that the process of making a product shown by a reference can be disregarded even though there is no other process shown in the applied

combination of references to prepare the product proposed by the examiner based on that combination of references, on the basis that one of ordinary skill in this art would have expected different methods to be used where different structures are involved (answer, page 6). Indeed, such reasoning does not explain how one of ordinary skill in this art would have arrived at the claimed structure encompassed by the appealed claims by following the applied prior art. *See generally, Rouffet, supra* (“hindsight” is inferred when the specific understanding or principal within the knowledge of one of ordinary skill in the art leading to the modification of the prior art in order to arrive at appellant’s claimed invention has not been explained).

Thus, we conclude that the examiner has not pointed to some teaching, suggestion or motivation in the applied prior art to combine Vuillermoz with the knowledge in the prior art acknowledged by appellants. *See Lee, supra; Smith Industries medical Systems, Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1420-21 (Fed. Cir. 1999); *Rouffet, supra; In re Mayne*, 1043 F.3d 1339, 1342, 41 USPQ2d 1451, 1454 (Fed. Cir. 1997); *Fritch*, 972 F.2d at 1266, 23 USPQ2d at 1783; *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 9292, 933 (Fed. Cir. 1984); *In re Keller*, 642 F.2d 413, 425-26, 208 USPQ 871, 881-82 (CCPA 1981).

Accordingly, we reverse the ground of rejection advanced on appeal because the examiner has not established a *prima facie* case of obviousness of the claimed structure on a semiconductor substrate encompassed by the appealed claims over the applied prior art.

The examiner's decision is reversed.

Reversed

CHARLES F. WARREN
Administrative Patent Judge

PETER F. KRATZ
Administrative Patent Judge

LINDA R. POTEATE
Administrative Patent Judge

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